SETTING THE STAGE

- Reactor physics is a key discipline that is a core element of every nuclear engineering education program.
- New excitement to:
  - improve our knowledge base
  - deepen our focus on fundamental physics
- GOAL: Contribute to practical solutions that will expand the use of nuclear energy to benefit our society

EMERGING AREA = area of increased focus and interest

- **Incorporating an expanded view of the world:**
  - **Fuel cycle physics, not just in-core physics**
  - **Be conversant and understanding of chemistry, materials, fuel performance, and thermal-hydraulics issues**

- **Coping with limited and dispersed resources**
  - **knowledge and information**
  - **experimental facilities**

Coping with limited and dispersed resources

- How can we best (optimally) integrate fundamental, basic experiments and extensive analysis capabilities to provide
  - the teaching, expanding, and refining of knowledge we need for new reactor designs, and
  - the confirmation of our knowledge as required by regulators
- Technically, we now have the ability to both observe and model phenomena at the atom level – is there value in going to this level of detail?
- How can we best use fundamental measurements and extend there applicability?

- **Looking beyond LWRs**
  - **next generation of commercial reactors**
  - **fission reactors for space exploration**

- **Needs for improved nuclear data**
  - **Measurements**
  - **Covariance data**
  - **Processing capabilities**
- **Proliferation concerns must be a major focus**

Request to Genie

- could be readily built by industry in 3-4 years;
- would provide efficient and reliable operations and economics;
- would have passive safety features;
- would have the consensus backing of industry, national labs, and government; and
- would be an integral component of a proliferation-resistant, sustainable fuel cycle.